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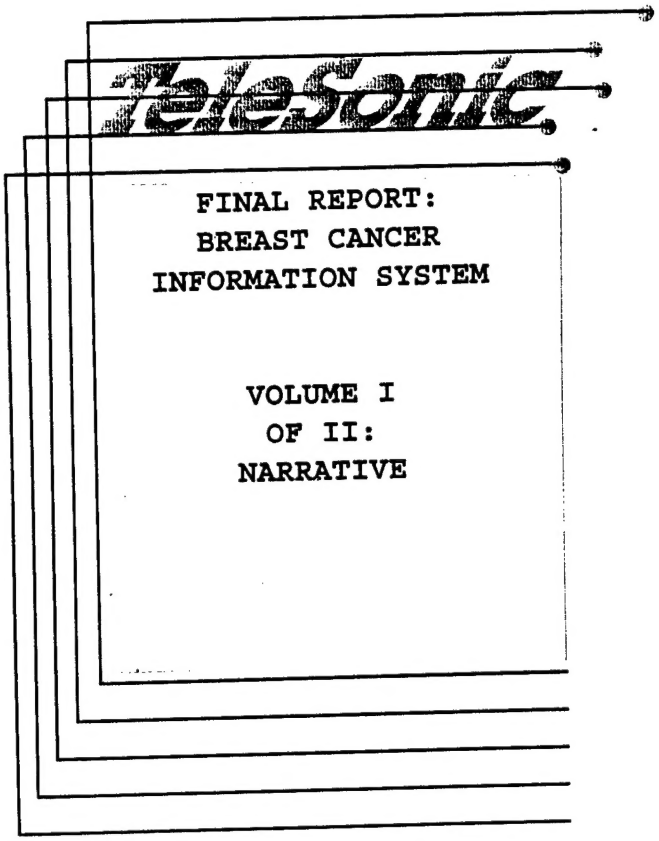

Breaking Through The Communication Barrier

FINAL REPORT:
BREAST CANCER
INFORMATION SYSTEM

VOLUME I
OF II:
NARRATIVE

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GRANT NUMBER DAMD17-94-J-4282

TITLE: Breast Cancer Information System Designed to Foster Increased Proactive Prevention Activities Among Minority Populations

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REPORT DATE: July 1997

TYPE OF REPORT: Final

PREPARED FOR: Commander
U.S. Army Medical Research and Materiel Command
Fort Detrick, Frederick, Maryland 21702-5012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 1997	Final (1 Jul 94 - 30 Jun 97)

4. TITLE AND SUBTITLE
Breast Cancer Information System Designed to Foster Increased Proactive Prevention Activities Among Minority Populations

5. FUNDING NUMBERS
DAMD17-94-J-4282

6. AUTHOR(S)
Leonard A. Blackshear, Ph.D.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Associated Enterprises, Inc.
Annapolis, Maryland 21401

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Commander
U.S. Army Medical Research and Materiel Command
Fort Detrick, Frederick, MD 21702-5012

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200*

The objective of TeleSonic's three-year study was to determine if automated telephone information systems are an easy and effective way to communicate information about breast cancer prevention to informationally hard-to-reach populations. For this research, the informationally-hard-to-reach population was defined as African Americans, and both African American and White low-to-moderate income women. TeleSonic examined user preferences for an automated telephone information system versus a live counselor referral service to determine if any statistically significant preferences exist among racial and income groups.

TeleSonic found that when faced with the choice of getting preventive health care information from an automated telephone information system versus a live counselor, both African American and White lower income women choose the automated telephone information system. In contrast, middle-to-upper income White women choose to speak to a live counselor. *These results support the project's major hypothesis*: that using a multimedia automated telephone information system is an effective means of reaching "informationally hard-to-reach" populations, and getting them to take proactive, preventive care steps against breast cancer. Based on these results, we can conclude that TeleSonic's method has considerable implications for many areas of health care marketing, prevention, and treatment, particularly in targeting and reaching traditionally "hard-to-reach" populations.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Breast Cancer, Prevention, Voice Processing, Minority Populations	215
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

FOREWARD

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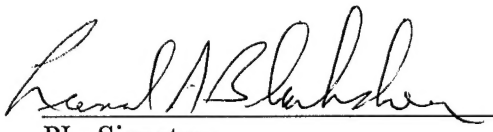

July 29, 1997

PI - Signature Date

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IV. INTRODUCTION

A. SUBJECT OF THE RESEARCH AND PROBLEM STATEMENT

Breast cancer is the most common cancer among women, and the second leading cause of death among women. In the State of Maryland, where the major effort of the telecommunications Breast Health Information Project took place, the incidence of breast cancer ranks the seventeenth worst in the nation (1995 Cancer Facts & Figures). Unfortunately, the overall statistics mask the real disparity of breast cancer incidence between White and African American females.

During the past 20 years, the prospects of survival for young white women diagnosed with breast cancer have improved, while the prospects for black women, especially older ones, are increasingly grim. African-Americans with breast cancer face more than twice the risk of dying compared with White Americans, primarily because they are diagnosed at more advanced stages of disease.

In addition to this alarming statistic, the American Cancer Society's 1989 "Report to the Nation on Cancer" states that cancer education and outreach efforts have not penetrated poor communities or tapped into the right information networks.

The Breast Health Information Project (BHIP) represents a multi-year research effort that assessed the effectiveness of automated messaging information systems in reaching minority and underserved women, and encouraging them to take proactive, preventive care steps against breast cancer. The research was conducted by the TeleSonic Division of Associated Enterprises, Inc., an Annapolis, Maryland-based telecommunications company.

B. BACKGROUND OF PREVIOUS WORK

The research conducted builds upon TeleSonic's earlier telecommunications research in the area of cancer health information systems.

In a previous telephone information system development project conducted by TeleSonic calling volume exceeded 400 percent of goal. This project was conducted for the Office of the Secretary, Office of Family Policy and Support, Department of Defense, in which calling volume was measured to a job bank telephone information system among military families. This joint service project included Army Community Services, Navy Family Service Centers, the Marines, and the Air Force Family Support Center. It was more successful than anyone could have ever predicted. The project clearly showed that lower income and hard-to-reach individuals with generally lower educational training backgrounds will seek out information that is provided in a convenient, readily accessible

telephone format, when made available. The implications for reaching the same audience of individuals with pertinent breast cancer information have future benefit potential beyond the scope of this project.

C. PURPOSE OF WORK

The Breast Health Information Project (BHIP) was a three-year research effort conducted by TeleSonic, with funding from the U.S. Department of the Army, Grant #DAMD17-94-J-4282A.

The objective of TeleSonic's three-year study was to determine if automated telephone information systems are an easy and effective way to communicate information about breast cancer prevention to informationally hard-to-reach populations. For this research, the informationally-hard-to-reach population was defined as African Americans, and both African American and White low-to-moderate income women. TeleSonic examined user preferences for an automated telephone information system versus a live counselor referral service to determine if any statistically significant preferences exist among racial and income groups.

The research conducted builds upon the TeleSonic's earlier telecommunications research in the area of cancer health information systems. For the BHIP research, TeleSonic developed an automated information system to be used in communicating information about breast health and breast cancer. Additionally, the company established a testing approach to evaluate the effectiveness of an automated telephone information system in increasing access to information, as compared to a live counselor referral service. This increased access to information is believed to be crucial in encouraging greater numbers of minority and underserved females to seek early diagnosis and appropriate treatment of breast cancer.

D. SCOPE OF THE RESEARCH AND METHODS OF APPROACH

Approach

TeleSonic has taken a new and innovative approach to fostering behavior changes among health care recipients. Rather than look at the issue strictly as a *health* problem, TeleSonic has approached it as a *marketing* problem. The result is a unique and cutting-edge technology solution that cost-effectively pinpoints target populations, and provides them with preventive health care information in a convenient, private, and non-threatening way.

TeleSonic's approach combines four major components: (1) A **geographic mapping process** for pinpointing target groups according to defined census criteria; (2) A **targeted direct mail campaign** for promoting a free preventive health information service; (3) An **automated telephone information system** that provides free 24-hour automated health

information; and (4) An **ad hoc report generator** that tracks direct mail response rates by census criteria and measures respondent behavior levels.

After defining target populations and identifying them geographically through a mapping process, TeleSonic used a direct mail campaign to promote both an automated telephone information system and a live counselor referral system. The company then compared the response rates by census criteria and measured caller behaviors using sophisticated data analysis techniques.

As part of the research, TeleSonic designed an automated telephone information system that provides detailed information about breast cancer. The system offers over 20 preventive care audio messages on topics including breast cancer risk factors, ways to lower breast cancer risk, how to do a breast self-examination, when to get a mammogram, and where to get more information. The system also offers callers the option to get additional information by mail or fax, and/or to transfer to a live counselor.

In addition, TeleSonic developed a highly specialized geographic targeting technique that segments zip code areas into census block groups, pinpoints geographic concentration areas of specific populations by demographic and psychographic criteria. The project cost-effectively reached these populations with preventive health care information. TeleSonic's approach integrated geographic mapping and audiotex technology as a proven, effective means of reaching "informationally hard-to-reach" populations with health information and fostering them to take preventive health care actions.

Goals of the Research

TeleSonic's hypothesis stated that using a multimedia automated telephone information system is an effective means of reaching "informationally hard-to-reach" populations, and getting them to take proactive, preventive care steps against breast cancer.

TeleSonic identified several key evaluation questions for measuring the success of its hypothesis. These evaluation questions included: (1) Determining if the use of telecommunications increased the number of females seeking information about breast cancer, and if so, determining if the rate of increase varied by race or social-economic status (SES). (2) Determining whether callers had a preference for an automated telephone information system versus a live counselor referral service for obtaining information about breast cancer. (3) Determining if the increased access to breast cancer information resulted in increased proactive actions such as screening and physician appointments, and if so, whether subsequent actions varied by race and/or SES?

To answer the research questions, TeleSonic measured three different levels of behavior by race and income: (1) Response to the direct mail campaign (by calling the automated telephone information system or the live counselor referral service); (2) Information gathering actions taken while using the automated telephone information system; and (3) Subsequent preventive care actions taken as a result of using the automated information

system. These three different levels of behavior were designated as behavior levels one, two, and three.

Behavior Level One measured caller response rates to a targeted, controlled direct mail campaign. For this measurement, call counts into the telephone system were tracked and compared to the total number of pieces mailed. Because this was the most basic of the three behavior levels, TeleSonic expected the greatest response in this category.

Behavior Level Two measured what actions callers took when they called the automated telephone system. Actions in this behavior category indicated how actively callers utilized the breast cancer prevention information presented. For this behavior level, TeleSonic measured caller actions such as time-on-line, number of messages listened to, transfers to a live counselor, request for information by mail or fax, completion of a "personal profile" assessment", and participation in an optional survey.

Behavior Level Three, the most difficult category to measure, examined subsequent actions of callers to determine if they took any new preventive and/or proactive breast cancer prevention actions as a result of using the telephone information system. Behavior Level Three actions include such proactive steps as practicing breast self-examination, scheduling an appointment with a medical practitioner, or scheduling a mammogram.

TeleSonic also identified anticipated outcomes for the three-year research period, as follows:

(1) The successful development and operation of an innovative multimedia breast cancer telephone information system
(2) An increase in females taking proactive breast cancer prevention and diagnosis steps
(3) The collection of previously unavailable data to measure the effectiveness of the system in reaching minority and underserved populations
(4) The enhancement of currently available breast cancer information for use by physicians, patients, and concerned family members.

Identified Tasks

To answer the research questions, TeleSonic developed nine major tasks, as follows:

Task 1:Determine content of the information system
Task 2: Research technical system design issues
Task 3: Research issues/topics and produce messages identified for the information system's audiotex/faxiotex library
Task 4: Acquire and set up the demonstration system model
Task 5: Establish system and data retrieval routines
Task 6: Develop and implement the outreach and promotional campaign plan

Task 7: Conduct at least two comparable tests of the system
Task 8: Research, define, and identify appropriate future modes of sustaining the information beyond the test phase
Task 9: Document and report results

The information presented in **Appendix A, Project Work Plan**, highlights these tasks.

Testing Strategy

To test its hypothesis, TeleSonic identified four main target groups by race and income level: a White Low-Moderate income group (WLM), a White Middle-Upper income group (WMU), an African American Low-Moderate income group (AALM), and an African American Middle-Upper group (AAMU). This structure allowed TeleSonic to measure response rates to a direct mail campaign by both race and income.

The overall research design encompassed one pre-test and four test efforts, as follows:

- A **Pre-Test**, conducted in Baltimore, Maryland, prior to initiating Test One. This pre-test examined the response patterns of callers, using a small sampling from the targeted households. The pretest was designed to provide information to help determine the number of mailings for Test One and subsequent tests. In addition, the pretest was designed to obtain any information regarding the subjects' reactions to the content and the overall system. This information was used to make adjustments to the system before Test One.
- **Test One**, conducted in Baltimore, Maryland. This test was a comparative assessment of caller preferences in four target groups for an automated telephone information system versus a live counselor referral service. Test results were statistically significant.
- **Test Two**, conducted in Annapolis, Maryland. This anecdotal assessment compared respondent patterns to an automated telephone information system versus an on-line bulletin board system in an African American low-income target group.
- **Test Three**, conducted in Philadelphia, Pennsylvania. This test was a comparative assessment of caller preferences in four target groups for an automated telephone information system versus a live counselor referral service. Test Three mirrored the design of Test One in a different geographic area, and was designed to validate the statistically significant results of Test One.
- **Test Four**, conducted in Baltimore, Maryland. This anecdotal test compared caller response patterns to different promotional media and different media messages in an African American low-income target group.

V. BODY

A. EXPERIMENTAL METHODS USED AND RESULTS OBTAINED

1. Research Method and Testing Strategy

As stated in the **Introduction** section, nine major tasks were identified to answer the research questions, as follows:

Task 1:Determine content of the information system
Task 2: Research technical system design issues
Task 3: Research issues/topics and produce messages identified for the information system's audiotex/faxiotex library
Task 4: Acquire and set up the demonstration system model
Task 5: Establish system and data retrieval routines
Task 6: Develop and implement the outreach and promotional campaign plan
Task 7: Conduct at least two comparable tests of the system
Task 8: Research, define, and identify appropriate future modes of sustaining the information beyond the test phase
Task 9: Document and report results

The hypothesis of the research study stated that "informationally hard to reach" populations will prefer an automated telephone information system over a live counselor systems as a means of obtaining breast health information. The major hypothesis and related hypotheses are detailed below.

Major Hypothesis: Multimedia automated telephone systems enhance live referral alone as a vehicle to reach the informationally hard-to-reach.

Related Hypotheses:

1. Callers overall will show a greater tendency to call a multimedia automated telephone system combined with live referral than to call the live referral alone.

2. Within racial groups, callers at different socio-economic status (SES) levels will show significant differences in caller preferences for use of a multimedia automated telephone system with a live referral option compared to live referral alone .

3. Callers at lower SES levels will show a significant preference for the use of a multimedia automated telephone system with a live referral option compared to live referral alone.

4. Callers with higher SES levels will show significant differences by racial groups in their preference for the use of a multimedia automated telephone system with a live referral option compared to live referral alone.

5. Callers with lower SES across racial groups will show a preference for the use of a multimedia automated telephone system with a live referral option compared to live referral alone.

6. A culturally sensitive outreach strategy will increase caller volume compared to a less-culturally-focused outreach strategy.

7. Callers in different geographical areas will show a significant preference for a multimedia automated telephone system with live referral compared to live referral alone.

Within the context of this research and the hypotheses, the technical option was designed to collect data related to six issues:

1. Number of callers from a particular area
2. Number of topics accessed by a caller, general preferences, preferences by census area, preferences for calls taking the personal assessment
3. Number of callers who transferred to a live counselor by census area
4. Analysis of caller topic preferences by call census area
5. Number of callers requesting fax or hard copy by census area
6. Number of callers by census area who responded to follow-up surveys

To test the hypothesis, a pre-test and four tests were conducted over the three-year research period. As the focus of the study, we examined user preferences for an automated telephone information system versus a live counselor system to determine if there are any statistically significant differences among racial and income groups.

The research design for the Breast Health Information Project included two anecdotal tests, in addition to a comparative testing research design. The comparative test design replicates Test One and Three to provide large sampling sizes in different geographical areas. This comparative test design examined the validity of test results. However, Test Two and Test Four were established to provide anecdotal information in two important areas related to providing health information. These tests examined the impact of a different technology and different outreach strategies in reaching the informationally-hard-to-reach.

TeleSonic's three-year study was built upon the premise that an innovative automated telephone information system could increase preventive actions against breast cancer among minority and underserved female populations by fostering them to take action. To measure its success level in accomplishing this goal, three specific "behavior levels" were defined. Each behavior represented a different level of preventive or proactive action

taken by callers to the automated telephone information system. TeleSonic anticipated different response patterns to each of the three behavior levels.

Behavior Level One measured caller response rates to a targeted, controlled direct mail campaign. For this measurement, call counts into the telephone system were tracked and compared to the total number of pieces mailed. Because this was the most basic of the three behavior levels, the greatest response level was expected in this category.

Behavior Level Two measured what actions callers took when they called the automated telephone system. Actions in this behavior category indicated how actively callers utilized the breast cancer prevention information presented. For this behavior level, TeleSonic measured caller actions such as time-on-line, number of messages listened to, transfers to a live counselor, requests for information by mail or fax, completion of a "personal profile" assessment", and participation in an optional survey.

Behavior Level Three, the most difficult category to measure, examined subsequent actions of callers to determine if they took any new preventive and/or proactive breast cancer prevention actions as a result of using the telephone information system. Behavior Level Three actions included such proactive steps as practicing breast self-examination, scheduling an appointment with a medical practitioner, or scheduling a mammogram.

The first two behavior levels could be measured directly, based on tracking and analyzing caller telephone actions. The third behavior level was based on self-reports from callers to the system, without verification. It was also based on capturing information from people volunteering to participate in follow up survey efforts. The self report basis for Behavior Level Three reflects one of the limitations of this research effort.

Data capture information for past telecommunications systems have basically focused on the level of throughput and the number of calls received. Therefore, assessing and comparing response patterns for Behavior Levels 2 and 3 that are directly tied to a telecommunications application became both a challenge and a limitation for this research.

Determination of Sample Size

In developing expected caller response statistics, information on Behavior Level 1 response patterns were available from a range of application telephone information systems. Response patterns were included from job lines, real estate areas, travel information, dating services, health services, and retirement services.

Based on response patterns for other telecommunications applications, in general, the estimated calls to the live counselor system were originally projected at 5% for the first month, and up to 7.5% for a three-month period. A higher response pattern was projected for the automated telephone system, at 7% for the first month, and up to 10% for a three-

month period. These response rates are achievable when appropriate advertisements and promotions are used to market the information systems.

Because these expectation levels were met and exceeded during the pretest, the adequacy of sampling size was calculated for each treatment group to be tested. Actual response rates in testing were much lower, however. As a consequence, the adequacy of the required sample sizes for each treatment group was recalculated to determine any need for expanding the test population. The recalculation showed that the size of the response level was appropriate for statistical analyses for Behavior Level 1. Response sizes were inappropriate for statistical analyses for Behavior Levels 2 and 3. However, qualitative measurements were possible for these two behavior levels. In addition to using Chi-square tests for quantitative statistical analyses, qualitative analyses were provided through summary notes of data obtained from the research and reactions from focus group assessments. The focus group reactions to the results produced a representative assessment of the validity of the data response for the appropriate targeted population.

COMPARATIVE TESTS: TESTS ONE AND THREE

TEST ONE

Both Tests One and Three were designed to assess caller preferences in four target groups for an automated telephone information system versus a live counselor referral service. For each test, a geographic test area was selected based on "qualifying" census data. Because the testing strategy involved mailing information to four distinct target groups and then measuring the response rates, the test area needed to have "concentration areas" of each target group. To ensure the statistical validity of results, a minimum concentration level of the target population was set for qualifying census areas. For example, a census area defined as "African American Lower Moderate" needed to have at least a 55% minimum percentage of African American Lower Moderate persons living in that census area. The minimum percentage was identified to ensure the overall concentration of our distinct target groups to support call level expectations.

Once the test area was qualified and selected, TeleSonic created "maps" for each of the four target groups using Geographic Information System (GIS) mapping software. These maps identified the qualifying Census Block Groups (CBGs) within the test area that met the minimum concentration level or higher for the particular target group.

After identifying the "qualifying" CBGs for each target group, TeleSonic then utilized a mailing house to randomly select 5,000 addresses for each target group. Each of the four target groups (WLM, MWU, AALM, and AAMU) was divided in half, for a total of eight mailing groups. Each mailing group consisted of 2,500 households. For tracking purposes, eight promotional pieces or "postcards" were created to correspond to the eight mailing groups, each displaying a different 800-telephone number. Four of the eight postcards promoted the automated telephone information system, and four promoted a

live counselor referral service. Under controlled conditions, 2,500 randomly selected households in each of the eight mailing groups were then mailed a postcard, and caller response rates were tracked.

Table 1: Direct Mail Design Strategy -- Test One (Baltimore, MD) and Test Three (Philadelphia, PA)

TARGET GROUP	NUMBER OF AUTOMATED TELEPHONE INFORMATION SYSTEM POSTCARDS MAILED	NUMBER OF LIVE COUNSELOR SYSTEM POSTCARDS MAILED	TOTAL NUMBER OF POSTCARDS MAILED
WLM	2,500	2,500	5,000
WMU	2,500	2,500	5,000
AALM	2,500	2,500	5,000
AAMU	2,500	2,500	5,000
TOTALS	10,000	10,000	20,000

Test One was conducted in the Baltimore metropolitan area in the Fall of 1995. Based on call volumes into the live and automated systems, as well as caller activity within those systems, we were able to determine some caller preferences by time of day, race, and income level. **Test Three** was conducted in the Fall of 1996 in the Philadelphia metropolitan area. Test Three was designed to validate the Test One results in a different geographic area, using higher racial and income density criteria levels.

Test One was implemented during the three-month period of September 14 through December 17, 1995. As previously noted, the basic design included the mailing of postcards to 20,000 households across the metropolitan Baltimore, Maryland area. The mailings were randomly assigned across a total of 634,750 households, affecting Baltimore City and the five central Maryland counties of Anne Arundel, Baltimore, Carroll, Harford, and Howard.

Within the affected households, the populations were segmented into four census area groups, each with two sub-groups. The four census areas included low to moderate African Americans and whites and middle to upper income census areas for the same racial groups. Each of the four groups were then further segmented by random assignment into Treatment A (households to receive the postcard about the live counselor

system) and Treatment B (households to receive the postcard about the automated information system).

To control and monitor data results, postcards were printed with a separate telephone number for each of the eight treatment groups. This process allowed research staff to capture and segment caller activity by census area and treatment group. As a consequence, eight separate and unique telephone numbers were dedicated to this test, each for a specific treatment group. Caller activity could then be analyzed by income and race.

Identification of Households -The random assignment of the four groups into Treatment A and Treatment B was made after receipt of address labels to support the mailings to the specific addresses. This was accomplished by identifying a mail house that could provide address labels with the highest match to the number of households identified within the metropolitan Maryland census analyses. The two mail houses with the closest match in household counts were then assessed to determine their ability to provide geo-coded address labels to identify households within specific census blocks. Specific directions were given to the mail house regarding the selection process for the address labels. The key directions included five major steps:

1. Using census block group files to create the four defined census areas, which represent the qualifying addresses.
2. Assigning a random number to the addresses, using a random program generator.
3. Drawing 20,000 random addressees, 5,000 from each census area 1 to 4, in randomly selected groups A and B.
4. Assembling the eight sets of random census areas in zip code order.
5. Applying Cheshire labels and clearly marking the census sets for each of the four census areas as census lists 1A through 4B.

Once the address labels were received, a blind assessment was completed to determine the accuracy of the address information. The blind test included assessment of two to three 11 x 15 sheets of addresses from each of the four targeted groups. The address labels were received with each of the four targeted groups labeled as a separate package of labels. Each of the four packages was broken into two sets of addresses: sets "A" and "B," corresponding with Treatment A and Treatment B.

To assess the accuracy of the address labels, a page of address labels was taken from near the beginning, the middle or the end of each group. These were copied and all sheets were then mixed together without labels. Appropriate research staff were then asked to complete a demographic comparison by comparing the addresses from the sheet with the census block information to determine which of the four census groups that the sheets represented. This blind test provided verification that the addresses were appropriately labeled as low to moderate income African American or White, and as middle to upper

income African American or White. Once the address labels were verified, each set of four labels was affixed to the postcards for mailing.

Mailing Process -The Phase One Test was designed to obtain responses over a three-month period, based on the expected response rates for telecommunication systems. The mailing to the 20,000 households was spread in equal increments over an extended period of three-week intervals, to ensure that no system overload occurred for either CIS or ACS. Each treatment group within the four target areas received 625 mailings per interval, for a total mailing of 5,000 per target area, based on the following schedule:

1st mailing:	September 13, 1995	625 mailings each treatment	Total mailings 5,000
2nd Mailing:	October 6, 1995	625 mailings each treatment	Total mailings 5,000
3rd Mailing:	October 26, 1995	625 mailing each treatment	Total mailing 5,000
4th Mailing:	November 17, 1995	625 mailings each treatment	Total mailing 5,000

The mail was processed through a two-phase effort. First, research staff prepared eight different sets for mailing. These sets included the postcard and the appropriate address labels for each treatment group. A second staff member was assigned to verify the accuracy of the first staff person's efforts. The sets were placed into eight different mailbags and taken to a local mail house for mail preparation and final mailing.

The local mail house was responsible for affixing address labels to the postcard, sorting postcards by zip code, affixing stamps, then delivering the eight mailbags to the central post office for mailing. Since a mail house was responsible for a portion of the mailing effort, research staff monitored the mail process to determine actual dates the postcards were delivered to the US Postal Service. The mailing dates noted earlier represent the actual dates the mailbags were submitted to the US Postal Service.

All postcards were mailed bulk rate, address correction requested. The delivery date for bulk mail in the target area ranged from one to ten days, as reported by the postal service. The "address correction requested" stamp was used to increase the level of assurance that undelivered postcards were returned, and therefore could be analyzed to determine delivery rates and any major variance by treatment groups.

The expected response rates were based on the assumption of responses over a three-month period of exposure. Under this assumption, the close out period for data collection should have gone until three months after the final mailing, to February 17th. The data collection, however, was contained within a data collection period of three months from the first mailing, September 13 through December 17th. After data analyses, the data collection period was then augmented by focus group reviews.

Postcards were mailed to households designated as either Treatment A or Treatment B. Treatment A households received a postcard that promoted the opportunity to speak to a live counselor and get answers to individual questions. (A sample postcard for Treatment A, Live counselor information system, is included in **Appendix B**). The Treatment B households received a postcard that promoted the convenience of calling an information system, seven days a week, 24 hours a day. The postcard for Treatment B provided information about a "library" of prerecorded message topics that covered issues about breast health. (A sample postcard for Treatment B, automated information system is included in **Appendix C**).

Data Collection - An additional area of activity during the test period related to data collection. Caller activity was analyzed by examining caller "logs". These caller logs provided identification of the telephone number being called (corresponding to census area and treatment group), time and date of call, length of call, and the different features used by callers. This information was captured for both the automated and the live counselor information systems. As a note, however, once the caller to the live counselor transferred from the research system to CIS or ACS, the system could no longer monitor caller activity. Whether or not the caller was successful in accomplishing the call or experienced a busy signal could not be assessed. As a consequence, the prerecorded system messages gave each caller choosing to call CIS or ACS the direct telephone numbers in the event that a busy signal was encountered.

Data on the call behavior by treatment group was collected automatically by a call log. It should be noted that the originating phone number of the call was not tracked, to protect the identity of callers. The only identifying information came from those callers who voluntarily offered to provide follow-on feedback. Computer program routines were written to purge data and generate reports on variables needed for research analysis. Data were purged to exclude staff calls for daily line qualification, review and system evaluation. These calls were coded for easy extraction. In addition, computerized calls into the system were purged based on computer programming patterns that were discerned. These included set patterns of seven calls to the same telephone number at six to seven second intervals. Call reports were also monitored to ensure that no calls were received from areas blocked from the call region.

Finally, calls were excluded for the four-day period of November 28th through December 1st for all treatment groups. These calls were excluded because of a highly atypical call pattern that was observed within one treatment group. The calls were outside of any normal range of calls for the treatment group. During this period, the daily average call was nearly three to four times the daily average during any other period. This occurred during a period when no mailings were recently delivered by the postal service, when there were no national newsworthy announcement affecting breast health or breast cancer. Some of the calls could be tracked and purged as a result of staff testing but others were still questionable. As a consequence, to ensure consistency of effort, calls were eliminated from all treatment groups for the period.

To ensure efficient functioning of the system, during the three-month period, daily line qualification tests were conducted. These line qualification tests required that staff check the system to ensure that all lines were functioning, to check and identify any disruptive sounds or line interference, and to check the volume levels. Only minor interferences were identified, and corrected. No problems encountered during this period were significant enough to skew results from any treatment groups.

As a final note, the system operated on an "automatic pilot" during the three-month implementation period. Once the system was developed and activated, all activities were directed toward monitoring the system for operational functionality, periodic mailing, and data collection.

Data Analysis - Quantitative and qualitative assessments were used to analyze the data received from these two tests. The Chi-square test, which is both a test of association and distribution, was used to provide the quantitative assessments. The test compares the frequency of observed and expected occurrences for the data samples. This statistical test measures whether the differences observed are sufficiently large enough to conclude that they did not occur by chance, but instead reflect real differences. The Chi-square test shows the level of association between two categorical variables. In addition, it can be used to show the strength of that association.

A probability level of $p \leq .05$ was used to investigate the strength of the association between variables. The research results were analyzed under the statistical leadership of a statistical consultant from the University of Maryland Hospital in Baltimore, Maryland.

Focus Group Review -Focus group discussions were held during the development and pretest of the BHIP research effort. These discussions proved invaluable in developing the mailing process and contents and in modifying system functions and content. As a consequence, when the review of the analyzed data showed overwhelming caller preferences for the automated system, it was concluded that additional focus groups might be helpful in gaining insight into the call behavior.

During the months of February, March, and April 1996, five focus group sessions were identified and held. These groups were identified by working with central Maryland organizations whose memberships are representative of the four census areas in our target groups. Originally, four focus group sessions were planned. TeleSonic requested each group participant to voluntarily complete a pre-questionnaire before discussions. This pre-questionnaire was designed to determine any changes in opinions and attitude, as a result of the discussions and to ensure appropriate income representation. The pre-questionnaire showed that low-income representation was not being provided from the expected groups, as a consequence, an additional focus group, for a total of five, was identified and conducted.

Each group meeting took place during a lunch period, or just before or after lunch and included an opportunity for general discussions over refreshments, before the discussion commenced. Each group followed the same process, which included:

1. Introductions
2. Purpose
3. Summary of Phase One Test results
4. Completion of pre-questionnaire
5. An opportunity to listen to the automated messages and review the postcards, and
6. Discussion of six questions.

The focus group sessions lasted from one and one-half to two hours, on average. Members were asked if they would agree to have sessions recorded to ensure accuracy in reporting; all participants agreed.

Test One Findings

Overall, the findings from Test One research efforts showed a significant difference in the response pattern of callers, as follows:

- Caller results showed a preference for the automated information system compared to the live counselor information system.
- Callers across all race and income lines preferred using the automated system in the evenings, from 6PM to 12AM.
- There were *no significant differences* in response by race.
- Significant differences were observed between income groups.

By race, African Americans and Whites responded very similarly to the mailing. Similar numbers of African Americans and Whites called the automated and live counselor systems. The only discernible racial difference was that African Americans spent more time using the automated system than Whites.

By income level, a greater number of low to moderate income level persons responded to the mailing, called the automated system, and spent more time using the automated system than middle to upper income level persons.

The number of telephone calls from the African American and White census areas were about the same, a little better than 300 each. Overall, 650 calls (a response level of 3.3%) were received. Although the response level is less than originally anticipated, it was twice as high as the response pattern of approximately 2% that is considered good from direct mailing, and is large enough to assess areas of significance between treatment groups.

During the original design and planning stage, it was acknowledged that a mail outreach strategy without any related outreach support would not be as effective as other more

aggressive or direct outreach efforts. However, it was concluded that a mail outreach strategy would provide the cleanest design for clearly assessing any difference in responses for the targeted populations. As a consequence, to control for seepage, the general use of advertising and promotion was eliminated.

The number of calls from lower income census blocks were significantly higher than those calls coming from middle to upper income census blocks (376 compared to 274). This pattern was observed within the two racial groups. One hundred ninety-five low to moderate African Americans responded to the mailing, as opposed to 133 middle to upper income African Americans. One hundred eighty-one low to moderate income Whites responded to the mailing, compared with 141 middle to upper income Whites.

Tables 2, 3, 4, 5, and 6 on the following pages summarize these results. These tables show that significant results exist in two areas: (1) preference for the automated telephone system, and (2) response pattern from low to moderate income groups. More detailed data reports are presented in **Appendix D, Test One Data Reports**.

Table 2: Test 1 Comparison of Overall Call Responses

Exposure	Mailings	Calls	Response	X^2(p-value)
Automated	10,000	406	4.1%	41.7($p<0.001$)
Live	10,000	244	2.4%	
Total	20,000	650	3.3%	

Note: Shaded area reflects statistically significant differences.

Table 3: Test 1 Comparison of Call Responses by Income and Racial Groups

Exposure	Mailings	Calls	Response	X^2(p-value)
African American	10,000	328	3.3%	0.057(p=0.811)
White	10,000	322	3.2%	
Low-Moderate	10,000	376	3.8%	16.5(p<0.001)
Middle -Upper	10,000	274	2.7%	
African American				
Low-Moderate	2,500	195	3.9%	12.1(p<0.001)
Middle-Upper	2,500	133	2.7%	
White				
Low-Moderate	2,500	181	3.6%	5.1(p=0.02)
Middle-Upper	2,500	141	2.8%	
Low -Moderate				
African American	2,500	195	3.9%	0.542(p=0.462)
White	2,500	181	3.6%	
Middle-Upper				
African American	2,500	133	2.7%	0.24(p=0.624)
White	2,500	141	2.8%	

Note: Shaded areas reflect statistically significant differences.

Table 4: Test 1 Comparison of Call Responses by Treatment within Racial and Income Groups

Exposure	Mailings	Calls	Response	X^2(p-value)
African American				
Automated	5000	200	4.0%	16.3 (p<0.001)
Live	5000	128	2.6%	
White				
Automated	5000	206	4.1%	26.0 (p<0.001)
Live	5000	116	2.3%	
Low-Moderate				
Automated	5000	231	4.6%	20.4 (p<0.001)
Live	5000	145	2.9%	
Middle-Upper				
Automated	5000	175	3.5%	21.7 (p<0.001)
Live	5000	99	2.0%	
Low-Moderate				
African American				
Automated	2500	114	4.6%	5.81 (p=0.016)
Live	2500	81	3.2%	
White				
Automated	2500	117	4.7%	16.1 (p<0.001)
Live	2500	64	2.6%	
Middle-Upper				
African American				
Automated	2500	86	3.4%	11.7 (p=0.001)
Live	2500	47	1.9%	
White				
Automated	2500	89	3.6%	9.99 (p=0.002)
Live	2500	52	2.1%	

Note: Shaded areas reflect statistically significant differences.

Table 5: Test 1 Comparison of Call Responses to the Automated Information System

Exposure	Mailings	Calls	Response	x^2 (p-value)
African-American	5000	200	4.0%	0.09 (p=0.761)
White	5000	206	4.1%	
Low-Moderate	5000	231	4.6%	8.05 (p=0.005)
Middle-Upper	5000	175	3.5%	
Low-Moderate				
African-American	2500	114	4.6%	0.041 (p=0.84)
White	2500	117	4.7%	
Middle-Upper				
African-American	2500	86	3.4%	0.053 (p=0.817)
White	2500	89	3.6%	
African-American				
Low-Moderate	2500	114	4.6%	4.08 (p=0.043)
Middle-Upper	2500	86	3.4%	
White				
Low-Moderate	2500	117	4.7%	3.97 (p=0.046)
Middle-Upper	2500	89	3.6%	

Note: shaded areas reflect statistically significant differences.

Table 6: Test 1 Comparison of Call Responses to the Live Counselor Information System

Exposure	Mailings	Calls	Response	x^2 (p-value)
African-American	5000	128	2.6%	0.605 (p=0.437)
White	5000	116	2.3%	
Low-Moderate	5000	145	2.9%	8.89 (p=0.003)
Middle-Upper	5000	99	2.0%	
Low-Moderate				
African-American	2500	81	3.2%	2.05 (p=0.152)
White	2500	64	2.6%	
Middle-Upper				
African-American	2500	47	1.9%	0.258 (p= 0.612)
White	2500	52	2.1%	
African-American				
Low-Moderate	2500	81	3.2%	9.27 (p=0.002)
Middle-Upper	2500	47	1.9%	
White				
Low-Moderate	2500	64	2.6%	1.27 (p=0.26)
Middle-Upper	2500	52	2.1%	

Note: shaded areas reflect statistically significant differences.

In addition to the information on call volume patterns, some additional results were observed from the Test One research effort. These include caller preference related to time of day, specific messages accessed, and postcard return patterns.

Timing of Calls: Evenings and Sundays were the peak calling times for the automated system, whereas Wednesday evenings was the peak calling period to the live counselors. Callers from the African American census groups used Monday and Wednesday evenings as their peak call times for the automated system, and Thursday afternoons and Wednesday evenings as their peak call times to the live counselor. Callers from the white census areas preferred weekend evenings for calls to the automated information system and Wednesday evening and Friday afternoons as their peak call periods to the live counselor.

Except for callers from the low to moderate African American income area, caller preferences were for evening calls. Low to moderate income African American census areas showed call time preferences of Thursday afternoon for the live counselor system. There was much variation in the preferred call days with no observable consistent pattern beyond the evening preferences, except as previously noted. Clearly, the call-time preferences indicate obvious considerations for when users are most likely to access telecommunications information systems.

Table 7 summarizes the high/low call periods for each treatment group.

Table 7: Test 1 High and Low Calling Periods

	Strategy				***Ethnicity***		***Income Level***		
Call Periods	AALM	AAMU	W LM	W MU	AA	W	LM	MU	Overall
Call Volume Peak - Overall	Mon. Eve.	Wed. Eve.	Sun. Eve	Sun. Eve.	M &W Eve.	Sun. Eve.	Sun. Eve.	Wed. Eve.	Evenings
Lowest Call Volume- Overall	Night	Night	Night	Night	Tue,F & Sat night	Night & Sun. morn.	Tue. & Sat. night	Night	Tue. & Sat. nights
Peak- Auto	Mon. Eve.	Wed. Eve.	Sun., F & Sat Eve.	Sun Eve & M Aft.	Wed. Eve.	Sun Eve & M Aft.	Sun. Eve	Sun & Fri. Eve.	Evenings
Call Volume Peak- Live	Thurs. Aft.	Wed. Eve.	W Eve & Fri Aft	Wed. Eve.	Fri. Morn	Wed. Eve	Mon. Eve.	Fri. Morn	Evenings
Lowest C Volume-Auto	Night	Night	Night	Night	Night	Night	Night	Night	Night
Lowest C Volume-Peak	Night	Night	Night	Night	Night	Night	Night	Night	Night

Definition of time periods: Morning = 6am - 12pm; Afternoon =12pm-6pm; Evenings=6pm-12am; Night=12am-6am
Strategy Abbreviations: AA= African American Census Area; W=White Census Area; LM=low to moderate income group; MU=Middle to upper income group

TEST THREE

Test Three was designed to validate the Test One results in a different geographic area, using higher racial and income density criteria levels, and the same test design. In between these two tests, a smaller comparative test was conducted assessing user preferences for an automated telephone service versus an on-line computer service. However, because Tests One and Three were similar in design, Test Three will be discussed in this section prior to Test Two.

Test Three was implemented during the three-month period of September 3 through December 8, 1996, in the Philadelphia metropolitan area. Because the test was designed to validate the Test One results in a different geographic area, the basic design mirrored Test One. Postcards were mailed to 20,000 households across the metropolitan

Philadelphia, Pennsylvania area. The mailings were randomly assigned across households in the five counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia.

As in Test One, within the affected households, the populations were segmented into four census area groups, each with two sub-groups. The four census areas included low to moderate African Americans and whites and middle to upper income census areas for the same racial groups. Each of the four groups were then further segmented by random assignment into Treatment A (households to receive the postcard about the live counselor system) and Treatment B (households to receive the postcard about the automated information system).

Identification of Households -After receipt of the address labels from the mailing house, the four groups were randomly assigned into Treatment A and Treatment. The mail house utilized for Test One was selected again, based on their ability to provide address labels with the highest match to the number of households identified within the Pennsylvania census analyses and their ability to provide geo-coded address labels. The mail house utilized the same procedure as in Test One for selecting the address labels. As in Test One, once the address labels were received, a blind assessment was completed to determine the accuracy of the address information.

Mailing Process - We determined from caller traffic patterns in Test One that no system overloads had occurred for either the Cancer Information Service (CIS) or the American Cancer Society (ACS). As a result, in Test Three all 20,000 pieces were mailed at once, rather than in staggered increments. The mailing to the 20,000 households occurred on September 3, 1996, and results were measured through December 8, 1996. The mail was processed through the same two-phase effort utilized in Test One.

Data Collection - As in Test One, caller activity was analyzed by examining caller "logs". These caller logs provided identification of the telephone number being called (corresponding to census area and treatment group), time and date of call, length of call, and the different features used by callers. To preserve caller anonymity, caller logs did not provide any identification of the callers or the telephone number from which the call was placed. To ensure efficient functioning of the system during the three-month period, daily line qualification tests were conducted.

Data Analysis - Quantitative and qualitative assessments were used to analyze the data received from these two tests. The Chi-square test was used to provide the quantitative assessments. The test compares the frequency of observed and expected occurrences for the data samples. A probability level of $p \leq .05$ was used to investigate the strength of the association between variables. The research results were analyzed under the statistical leadership of a statistical consultant from the University of Maryland Hospital in Baltimore, Maryland.

Test Three Findings

The findings from Test Three research efforts indicated an overall preference for the automated system. In addition, Test Three results provided many statistically significant preferences, as follows:

- By race, African Americans showed a statistically significant preference for the automated system.
- By income level, lower moderates showed a statistical preference for the automated system. This statistically result occurred in both Tests One and Two.
- By race and income, White lower moderates showed a statistically significant preference for the automated system. In addition, White middle upper income persons showed a statistically significant preference for the live counselor system.

In addition to these statistically significant findings, callers across all race and income lines preferred using the automated system in the evenings, from 6PM to 12AM. Test Three showed no statistically significant differences in the response rates of callers to the automated and live counselor systems. By race, more Whites responded to the mailing. By income level, a greater number of middle to upper income level persons responded to the mailing, in particular to the live system.

Tables 8, 9, 10, 11, and 12 on the following pages summarize the Test Three results. These tables show that significant results exist in three areas: (1) preference of African Americans for the automated telephone system; (2) preference of low to moderate income groups for the automated system; and (3) Preference by White lower moderate person for the automated system. More detailed data reports are presented in **Appendix E, Test Three Data Reports.**

Table 8: Test 3 Comparison of Overall Call Responses

Exposure	Mailings	Calls	Response	X^2(p-value)
Automated	10,000	396	3.96%	1.31 (p=0.25)
Live	10,000	365	3.65%	
Total	20,000	761	3.81%	

Note: Shaded area reflects statistically significant differences.

Table 9: Test 3 Comparison of Call Responses by Income and Racial Groups

Exposure	Mailings	Calls	Response	X^2(p-value)
African American	10,000	296	2.96%	
White	10,000	465	4.65%	39.02 (p=0.000)
Low-Moderate	10,000	449	4.49%	25.64 (p=0.000)
Middle -Upper	10,000	312	3.12%	
African American				
Low-Moderate	2,500	177	7.08%	12.08 (p=0.001)
Middle-Upper	2,500	119	4.76%	
White				
Low-Moderate	2,500	272	10.88%	12.08 (p=0.001)
Middle-Upper	2,500	193	7.72%	
Low -Moderate				
African American	2,500	177	7.08%	
White	2,500	272	10.88%	14.80 (p=0.000)
Middle-Upper				
African American	2,500	119	4.76%	
White	2,500	193	7.72%	18.72 (p=0.000)

Note: Shaded areas reflect statistically significant differences.

Table 10: Test 3 Comparison of Call Responses by Treatment within Racial and Income Groups

Exposure	Mailings	Calls	Response	X^2(p-value)
African American				
Automated	5000	160	3.2%	15.19 (p=0.000)
Live	5000	136	2.7%	
White				
Automated	5000	236	4.72%	0.111 (p=0.74)
Live	5000	229	4.58%	
Low-Moderate				
Automated	5000	253	5.06%	7.58 (p=0.006)
Live	5000	196	3.92%	
Middle-Upper				
Automated	5000	143	2.86%	
Live	5000	169	3.38%	2.24 (p=0.135)
Low-Moderate				
African American				
Automated	2500	97	3.88%	1.69 (p=0.193)
Live	2500	80	3.20%	
White				
Automated	2500	156	6.24%	6.22 (p=0.013)
Live	2500	116	4.64%	
Middle-Upper				
African American				
Automated	2500	63	2.52%	0.422 (p=0.52)
Live	2500	56	2.24%	
White				
Automated	2500	80	3.20%	
Live	2500	113	4.52%	5.87 (p=0.015)

Note: Shaded areas reflect statistically significant differences.

Table 11: Test 3 Comparison of Call Responses to the Automated Information System

Exposure	Mailings	Calls	Response	x^2 (p-value)
African-American	5000	160	3.20%	
White	5000	236	4.72%	15.19 (p=0.000)
Low-Moderate	5000	253	5.06%	31.82 (p=0.000)
Middle-Upper	5000	143	2.86%	
Low-Moderate				
African-American	2500	97	3.88%	
White	2500	156	6.24%	14.49 (p=0.000)
Middle-Upper				
African-American	2500	63	2.52%	
White	2500	80	3.20%	2.08 (p=0.149)
African-American				
Low-Moderate	2500	97	3.88%	7.46 (p=0.006)
Middle-Upper	2500	63	2.02%	
White				
Low-Moderate	2500	156	6.24%	25.69 (p=0.000)
Middle-Upper	2500	80	3.20%	

Note: shaded areas reflect statistically significant differences.

Table 12: Test 3 Comparison of Call Responses to the Live Counselor Information System

Exposure	Mailings	Calls	Response	x^2 (p-value)
African-American	5000	136	2.72%	
White	5000	229	4.58%	24.59 (p=0.000)
Low-Moderate	5000	196	3.92%	2.07 (p=0.15)
Middle-Upper	5000	169	3.38%	
Low-Moderate				
African-American	2500	80	3.20%	
White	2500	116	4.64%	6.88 (p=0.009)
Middle-Upper				
African-American	2500	56	2.24%	
White	2500	113	4.52%	19.9 (p=0.000)
African-American				
Low-Moderate	2500	80	3.20%	4.35 (p=0.037)
Middle-Upper	2500	56	2.24%	
White				
Low-Moderate	2500	116	4.64%	0.04 (p=0.839)
Middle-Upper	2500	113	4.52%	

Note: shaded areas reflect statistically significant differences.

In addition to the information on call volume patterns, some additional results were observed from the Test Three research effort. These include caller preference related to time of day, specific messages accessed, and postcard return patterns.

Timing of Calls: As in Test One, in Test 3 we found that overall, most callers preferred calling in the evening, between 6PM and 12AM. There was also a strongly observed split in calling time preferences along racial and income lines. Along income lines, lower moderates showed a strong preference for afternoon calling times, while middle upper income persons called mostly in the evenings. By race, African Americans preferred the afternoon, while Whites preferred evening. All racial and income groups showed the least preference for calling during the night (from 12AM to 6AM).

Table 13 summarizes the high/low call periods for each treatment group.

Table 13: Test 3 High and Low Calling Periods

	Strategy				***Ethnicity***		***Income Level***		
Call Periods	AALM	AAMU	W LM	W MU	AA	W	LM	MU	Overall
Call Volume Peak - Overall	Aft.	Aft.	Eve.	Eve.	Aft.	Eve.	Aft.	Eve.	Eve.
Lowest Call Volume- Overall	Night	Night	Night	Night	Night	Night	Night	Night	Night
Call Volume Peak- Auto	Aft.	Aft.	Aft.	Eve.	Aft.	Eve.	Aft.	Eve.	Aft.
Call Volume Peak- Live	Aft.	Morn.	Eve.	Eve.	Aft.	Eve.	Eve.	Eve.	Eve.
Lowest C Volume-Auto	Night	Night	Night	Night	Night	Night	Night	Night	Night
Lowest C Volume-Peak	Night	Night	Night	Night	Night	Night	Night	Night	Night

Definition of time periods: Morning = 6am - 12pm; Afternoon =12pm-6pm; Evenings=6pm-12am; Night=12am-6am

Strategy Abbreviations: AA= African American Census Area; W=White Census Area; LM=low to moderate income group; MU=Middle to upper income group

ANECDOTAL TESTS: TESTS TWO AND FOUR

Test Two represents a brief and small scale assessment of the impact of current technologies in enhancing information access. This assessment attempted to obtain reactions to accessing and receiving health information on-line by low income African Americans. This test required users to critique an on-line bulletin board which computerized the library of the Breast Health Information Program. Although only a small number of subjects were included in this test, it was extremely important because of the growing and changing use of technology in providing information. The research design and sampling size for Test Two were not established to provide statistically significan results. However, the outcome of this test yielded valuable information indicators about the use of on-line health information. With low-income populations. Future research is recommended in this area.

Test Four was established to provide anecdotal information and greater insight related to the effectiveness of different outreach mediums in reaching the informationally hard-to-reach. This test used a much larger population than Test Two but much smaller than the sampling size needed for statistical significance. Like Test Two, Test Four only targeted low income African Americans. However, this test compared response patterns based on different outreach mediums: radio, community postings and mailings. The details of Test Four provide informative insights and recommendations for further studies on outreach strategies for the informationally hard-to-reach.

TEST TWO

Test Two was a small evaluation conducted in the Annapolis, Maryland area in the Summer of 1996 (in between Tests One and Three). The purpose of Test Two was to test whether or not accessing breast health information via another technology medium - an "on-line" computer system was an effective complementary automated method to get information to low income populations. The goal was to compare use of the two systems to determine if there was a preferred technology mode for getting health information to low income populations.

To test this strategy, two different demonstration systems were set up in two different low-income housing communities, a computer-based information system and an automated telephone information system. Response rates to both systems were tracked and compared.

Before the beginning of the test, women from three separate housing communities were invited to three separate receptions to introduce the test. One reception group was told about the telephone system, one was told about the computer system, and one was a control group.

As "incentive" for these women to participate in testing the systems, we offered them participation in a contest if they agreed to participate in a follow-up survey. The contest winner would receive an overnight stay at a local hotel and dinner for two.

Eighteen women agreed to participate in the follow-up survey. Results of this survey are included in **Appendix F**.

After the follow-up surveys were completed, the contest winner was drawn and a certificate was presented.

The "computer test" consisted of a computer bulletin board system with message content similar to the telephone information system, except that users accessed the information "on-line" through a computer, rather than from a touch-tone telephone. The computer bulletin board system had an easy-to-use menu structure that only required mouse clicks on menu choices to access the information.

The "telephone" test consisted of the same automated telephone information system used for Tests One and Three.

The Computer Test

The computer test ran from June 6, 1996 through July 18, 1996. From June 6 through July 2, the computer was situated in the computer room at Harbour House, one of the low-income housing communities. Because of low traffic in the computer room and little

use of the system, on July 3 the computer system was moved to the office of a local family practice physician where more people would have access to it.

We were able to track the following data about users of the system:

- Date, time, and number of log-ons to the computer system
- Survey Poll Results
- Personal Profile Poll Results
- "Improve" Questionnaire Results

Date, Time, and Number of Log-ons to the Computer System

While the computer system was situated in the computer room in the low income housing complex, no hits were recorded, indicating that the system was not used. After the system was moved to the physician's office, during the two weeks spanning July 3 to July 18, 30 hits were recorded.

Nineteen different persons logged onto the system, with 11 persons logging on one time each, 6 persons logging in two times each, and 2 persons logging in three times each.

Seven hits were recorded between the hours of 9 to 10am. Three hits took place between 10am and 12 noon. The majority of hits, 20, took place between the hours of 1pm and 6pm.

On-Line Survey Poll Results

To determine a "profile" of users of the computer system, the survey poll asked users four questions.

1. Are you male or female?

There were 26 responses to this question. 11.5% (3 respondents) were male. 88.4% (23 respondents) were female.

2. How old are you?

There were 26 responses to this question. 42.3% (11) were between 20 and 39 years old; 50% (13) were between 40 and 59 years old; 7.6% (2) were age 60 or older.

3. What is your race?

There were 20 responses to this question. 70% (14) were African American; 5% (1) were Asian; 25% (5) were Caucasian; none were Hispanic; none were Native American; and none were "other".

4. What is your annual household income (optional question)?

There were 20 responses to this question. 10% (2) were below $15,000; 10% (2) were between $15,000 and $24,999; 10% (2) were between $25,000 and $34,999; 20% (4) were between $35,000 and $49,999; 15% (3) were between $50,000 and $99,999; 5% (1) were over $100,000; and 30% (6) preferred not to answer.

Based on responses to these questions, most users of the system were:

- Female
- Anywhere between the ages of 20 and 59 years old
- African American
- With household incomes of $35,000 to $49,999

On-Line Personal Profile Poll Results

Respondents were asked a series of 4 questions in an effort to help them determine which messages would be most helpful to them.

1. Are you male or female?

There were 10 respondents to this question. 90% (9) were female; 10% (1) were male.

2. Is there a history of breast cancer in your immediate family?

There were 10 respondents to this question. 10% (1) had a family history of breast cancer; 90% (9) did not.

3. Have you had your breasts examined by a doctor or nurse in the past year?

There were 10 respondents to this question. 50% (5) had their breasts examined in the past year; 50% (5) had not.

4. Have you had or do you think you have breast cancer?

There were 10 respondents to this question. 100% (10) had not had or did not think they had breast cancer.

Based on results of these questions, most respondents:

- Were female
- Did not have a family history of breast cancer
- Had not had or think they had breast cancer

Respondents were divided evenly on having a breast exam in the past year.

On-Line "Improve" Questionnaire Results

Respondents were asked a series of six questions on how the service could be improved.

Only one person responded to this questionnaire. The respondent answered as follows:

- Had already completed the personal profile
- Was between age 40 and 59 years old
- Heard about the service through "other"
- After reading the library, would take follow-up action by making an appointment with a doctor for a breast exam
- Left her name and address for a follow-up survey and free gift

Telephone Test

The telephone test period ran from June 6, 1996 to July 18, 1996. During the test, 54 calls were received. Of these callers, 50 hung up at the "welcome" message, and one caller transferred to the operator. Only three callers "pressed one" to continue using the automated telephone system.

The majority of calls occurred on Tuesday evening (20 calls) and Friday evening (20 calls), and may be suspect of "hacker" calls according to patterns previously observed by TeleSonic.

Of the three callers who pressed one, two went on to use the system. These two callers listened to a total of two messages. Neither caller ordered a fax or requested that information be mailed to them.

Of the two callers, one participated in the voluntary survey. This respondent provided the following answers to the survey questions:

- Between ages 20 and 39
- Heard about this service through a friend
- After listening to message library, would take follow-up action of performing a breast self-exam

Although Test Two gave us only anecdotal information and no statistically significant inferences can be drawn, low usage of the automated telephone system and the computer system indicates that, used alone, they may not be the most effective means of disseminating health information to low income populations. *These technologies may better serve low-income populations when used in conjunction with other types of*

outreach, such as one-on-one counseling or direct mail. Results from Tests One and Three, as well as the focus group studies, clearly indicate that when the automated system is used in conjunction with another form of promotion, such as direct mail, that this is a very successful means of getting women to take preventive actions against breast cancer.

Literacy may have had an additional impact on the willingness of these low-income women to use computer-based information systems. This further supports the effectiveness of using an automated telephone system, where literacy is not a necessary criteria in order to obtain the information provided.

TEST FOUR

Because the results of Tests One and Three supported the major hypothesis, a fourth test was designed to test two additional areas: (1) the effectiveness of different forms of promotion on informationally hard-to-reach populations; and (2) the impact of "culturally sensitive" messages on caller response rates. The fourth test targeted the AALM target group only (TeleSonic's informationally hard-to-reach population) and tested caller response rates to the automated telephone information system.

Between Tests Three and Four, the automated telephone information system was refined and re-organized to provide easier and quicker menu selections, as well as to encourage callers to make immediate appointments for low cost mammograms and medical services.

In Test Four, the northeast section of Baltimore was selected for its high concentration of low-income African Americans, as well as its proximity to Johns Hopkins University Cancer Center. Johns Hopkins University Cancer Center offers low-cost mammograms and medical screening appointments, as well as breast cancer prevention classes.

The test promotional strategy encompassed direct mail, supermarket flyer distribution, and radio public service announcements. In addition, two different promotional messages were tested in each of the three promotional vehicles: a "generic" message (untreated) and a "culturally sensitive" message (treated).

For the direct mail component, 5,000 postcards were mailed to an African American low-income target group in Baltimore, Maryland. Twenty-five hundred cards were generic, and 2,500 cards had a "culturally sensitive" sticker applied to them.

For the supermarket component, a total of 5,000 postcards were distributed to three SuperPride supermarkets. The stores were selected for their geographic composition and proximity to Johns Hopkins University Hospital, where the low cost mammograms, doctor appointments, and educational classes were being offered. In addition to strategic placement at the courtesy counters, posters advertising the card giveaway were placed in each store. Sample brochures are included in **Appendix G.**

For the radio component, two public service announcements (PSAs) were created, a generic PSA and a culturally sensitive PSA. PSAs were aired on two different radio stations with strong listenership in our target group. A copy of the radio public service announcements is included in **Appendix H**.

Table 14: Test Four Design (Direct Mail, Supermarket Flyers, and Radio PSAs)

TARGET GROUP	NUMBER OF AUTOMATED TELEPHONE INFORMATION SYSTEM POSTCARDS MAILED	NUMBER OF FLYERS DISTRIBUTED AT SUPERMARKETS	NUMBER OF RADIO STATION PUBLIC SERVICE ANNOUNCEMENTS (PSAs)
AALM Untreated	2,500	2,500	41
AALM Treated	2,500	2,500	45
TOTALS	5,000	5,000	86

Test Four was conducted in the Baltimore metropolitan area in the Spring of 1997. The original purpose of the test would be to take a geographic area that had already been tested (Baltimore -- Test One) and whose results had been validated by another geographic area (Philadelphia -- Test Three), and add an additional "medium" such as radio or newspaper to the same test design to determine its impact.

However, Test Four was repositioned to address some additional points raised by proposal evaluators and Project Advisors, and to strengthen the available useful data on the automated system as an effective means of disseminating health-related information. The location (Baltimore, MD) and the timing of the test (Spring 1997) did not change. As such, the goals of Test Four were to:

- Test the impact of alternate media (to the direct mail approach used in earlier tests) on call volume to the automated telephone information system
- Test the impact of cultural sensitivity in media messages on call volume into the automated telephone information system
- Increase the opportunities for callers to initiate Level Two and Three behaviors (increasing commitments to healthy behavior) directly through the automated telephone system
- Decrease the caller hang-up rate

- Increase caller time on line
- Increase the number of calls into the system

In addition to the goals outlined above, several issues cited by proposal evaluators and Project Advisors were also addressed as part of Test Four. Industry statistics were researched and compared to the results achieved for the Breast Health Information system in the following areas:

- Industry hang-up rates for automated telephone information systems (as a comparison to hang-up rates observed in our automated system)
- "Hold" times for live counselor systems (as a comparison to "time on line" of the automated system)
- Cancer Information Service (CIS) abandon call rates (as a comparison to hang-up rates observed in the automated system)
- CIS average length of call (as a comparison to the average length of call observed in the automated system)
- Average direct mail industry response rates (as a comparison to the direct mail response rates achieved in our tests)

To accomplish the goals outlined for Test Four, as well as to effectively address the remaining project issues, Test Four was conducted in the Baltimore metropolitan area in the Spring of 1997, and ran for approximately seven weeks. Although the test did not provide statistically significant results, it allowed us to measure several important caller patterns, preferences, and behaviors.

The test focused on three main areas:

- Testing the impact of alternate media (to direct mail) on call volume into the automated telephone information system
- Testing the impact of cultural sensitivity in media messages on call volume into the automated telephone information system
- Increasing the opportunities for callers to initiate Level Two and Three behaviors directly through the automated telephone system

Test Four sought to find ways to increase call volume into the automated telephone system, rather than compare caller preferences for an automated versus a live counselor system (already tested and proven in Tests One and Three). Therefore, the live counselor system was not included.

Also, Test Four sought to measure the effectiveness of the automated telephone system as a means of reaching "informationally hard to reach" populations. The test targeted African American populations; however, white populations were not targeted, and income level criteria were not tested.

Approach for Measuring the Impact of Different Media on Call Volume

To measure the impact of different media as a means of generating call volume into the automated telephone information system, three different media were tested:

- Direct mail
- Flyers placed in grocery stores
- Public service radio announcements

All media promoted the automated telephone information system as a method of obtaining free, confidential information on breast health.

Approach for Measuring the Impact of Culturally Sensitive Media Messages on Call Volume

To measure the impact of cultural sensitivity in media messages on call volume, each of the three media had two test groups (for a total of six test groups):

- A "treated" group, that received a culturally sensitive media message and a culturally sensitive audio message on the automated system
- An "untreated" group, that received a generic (non-culturally sensitive) media message and generic audio messages on the automated system

Approach for Increasing Level Two and Three Behaviors

To give callers the opportunity to initiate Level Two and Three behaviors, a new call flow was developed with an "action script", that encouraged callers to take immediate action in a variety of preventive care areas. All six test groups heard the same action script. "Action opportunities" included:

- Immediate sign-up for a free mammogram
- Immediate sign-up for free classes on breast health at an area hospital
- Immediate transfer to sign up for a low cost doctor appointment
- Immediate request for information by mail or fax
- Immediate transfer to a live counselor
- Immediate ability to leave a message with questions and comments

Design Approach

Direct Mail. 5,000 postcards were sent via direct mail to African American households. 2,500 of these postcards had a culturally sensitive message; 2,500 postcards were generic.

Retail Establishments. 5,000 postcards were placed in three SuperPride grocery stores frequented by lower moderate income level African Americans. 2,500 postcards contained a culturally sensitive message; 2,500 were generic.

Public Service Radio. Two African American-specific radio stations (WBRG and WCAO) in Baltimore were targeted and selected. A culturally sensitive public service announcement was played in half the radio spots; a generic public service announcement was played in the other half of the radio spots.

Each of the six test groups had a separate 800 number. Measurements and comparisons were made between total call volume generated by the three different media, total call volume between culturally sensitive and generic media messages, and individual call volumes by media and by message.

We also measured the effectiveness and popularity of the caller "action opportunities", and compared the results to the type of media that generated the call.

Test Four Results

Although Test Four did not yield statistically significant results, the promotional methods tested and the caller behaviors observed provided us with some very useful anecdotal information.

As detailed earlier in this section, Test Four compared caller response rates to direct mail, supermarket flyers, and radio public service announcements (PSAs) as a means of promoting the automated telephone information system. In addition, two different promotional messages were tested: a generic message (untreated) and a culturally sensitive message (treated).

For the seven week test period, a total of 377 calls were received. Of these calls, 208 were from "untreated" strategies", while 169 were from "treated" strategies. The call counts within the individual strategies are detailed in the table below.

Table 15: Test Four Call Counts by Strategy

PROMOTIONAL METHOD	NUMBER OF PLACEMENTS	CALL COUNT
Mail - Untreated	2,500 cards	48
Mail - Treated	2,500 cards	79
Supermarket - Untreated	1,300 cards*	83
Supermarket - Treated	500 cards*	37
Radio - Untreated	24 PSAs**	77
Radio - Treated	28 PSAs**	53
TOTAL	N/A***	377

* A total of 2,500 untreated and 2,500 treated cards were provided to three different supermarkets. Figures noted represent the number of cards that were actually picked up by a shopper.

** Two different radio stations played both the untreated and the treated PSAs. One station alternated the play schedule between the two messages by week, while the other station alternated the play schedule by message.

*** Because of the differing nature of the placements, a total cannot be calculated.

As detailed in the table below, a comparison of treated versus untreated response rates shows that the untreated (generic) messages produced a greater *overall* caller response rate. In the case of the radio spots, the untreated message received a higher response rate, while in the direct mail strategies, the treated cards received a higher response. In the case of the supermarkets, the fact that a larger number of untreated cards were picked up than treated cards may have had an impact on the higher response rate to the untreated message.

Table 16: Test Four Call Counts by Treatment

TREATMENT	CALL COUNT
UNTREATED	
Mail	48
Supermarket	83
Radio	77
Total Untreated	208
TREATED	
Mail	79
Supermarket	37
Radio	53
Total Treated	169

The table below details the caller response rate by promotional method. Surprisingly, all three methods had a very similar overall caller response rate, despite the fact that different numbers of cards or radio spots were placed. Because the placement mechanisms were so different, it is difficult to draw comparisons between groups. The intent of Test Four was to draw comparisons *within* groups.

Table 17: Test Four Call Count by Promotional Method

TREATMENT	CALL COUNT
Mail	127
Supermarket	120
Radio	130
Total Calls	377

Test Four also provided some valuable insight into the behavior of callers to the automated system. Of the three forms of promotion, the respondents from the direct mail campaign and the supermarket displays were fairly "active" users of the automated system and the information provided, while respondents from the radio spots did not take advantage of much of the information provided. Although there were 130 radio spot respondents (the highest of the three forms of promotion), none of the callers went past the main menu. In contrast, respondents to the direct mail and supermarket cards were very active users of the information. These callers utilized the message library, the breast cancer prevention steps, the transfer to a live counselor option, as well as the optional caller survey.

One possible explanation for the stark contrast between the direct mail/supermarket respondents and radio respondents may be that both the direct mail and the supermarket respondents received a visual, tangible card that explained the service and prepared them for reaching an automated telephone information system. The radio respondents, on the other hand, had only the audio message to go on, and may have been somewhat surprised

when they reached an automated system, rather than a live person. The message that the "breast health information line" was actually an automated system may not have been as readily apparent to radio listeners as we originally thought.

Within each promotional method, there were no clear behavior differences between untreated and treated strategies. In some areas of the system, "treated" callers were more "active" users of information, while in other areas the "untreated" callers were more active users.

The table below details some of the caller behaviors by promotional method and treatment.

Table 18: Test Four Caller Actions by Strategy

Caller Action	# of Mail Untreatd Callers	# of Mail Treatd. Callers	# of Super-market Untreatd Callers	# of Super-market Treatd. Callers	# of Radio Untreatd Callers	# of Radio Treatd. Callers	Total # of Callers
Greeting	48	79	83*	37*	77	53	377
Main Menu	34	60	60	25	38	5	222
Prevention Steps Menu	3	10	7	4	0	0	24
Message Library Menu	18	23	14	14	0	0	69
Live Counselor Transfer	3	4	2	0	0	0	9
Voluntary Caller Survey	5	17	6	3	0	0	31
TOTAL ACTIONS	111	193	172	83	115	58	732

* As noted previously in this section in **Table 15**, the fact that a larger number of untreated cards were picked up than treated cards may have had an impact on the higher response rate to the untreated message.

In summary, the anecdotal results of Test Four indicate that there are no clear differences in caller response rates either by promotional method or by treatment. Caller response rates by promotional method (mail, supermarket, or radio) were almost even, while response rates by message (treated vs. untreated) varied by the form of promotion used.

We did find that direct mail respondents were the most active users of the information, supermarket respondents were also fairly active users, but radio respondents were not active users of the information.

B. METHODS AND RESULTS RELATIVE TO GOALS OF THE RESEARCH

This section compares each of the nine major project tasks with the results achieved. As detailed below, all nine tasks were successfully completed.

TASK 1: Determine content of the information system

a) Establish advisory panel
b) Seek input from advisors
c) Identify appropriate topics
d) Seek expert input on topics
e) Develop final list of topics
f) Determine appropriate message titles

All activities related to Task 1 were successfully accomplished.

A voluntary advisory panel was established that included a broad-based representation from the local health department, health educators, cancer patients, cancer research and telecommunications experts, medical practitioners engaged in oncology and representatives of breast cancer support groups, among others. A listing of the project advisors and consultants is included in **Appendix I**. These advisors provided input and assistance throughout the project in areas including topic selection, message content, and testing strategy.

Refinements to the research design evolved in the early stages of the research project, during the summer and fall of 1994, sparked by the synergistic effect of engaging a broad based representation of project advisors. These refinements were aimed to meet two basic goals:

1. To clearly define the research design to support operational considerations, and
2. To determine if refinement was needed to the research strategy that could improve the overall results.

The refinements enhanced and clearly define the proposed research plan. Three components were added or modified as a result of deliberations:

1. The inclusion of a pretest as a precursor to the demonstration tests.
2. The inclusion of a process for input and recommendations from the target groups through the use of focus groups; and

3. Development of a series of comparative tests to look at the difference in caller preference for automated and live information systems across ethnicity, income and geographical areas. The test was expanded to include comparative analysis of the difference in response patterns based on a change in the outreach strategy.

More than 70 topics were originally researched and identified by project staff. Then after receiving input from advisors through rankings and discussions, the number of topics was reduced. Because differences were observed in information interest along racial and income lines, a series of focus groups were used to determine which topics to include in the automated telephone system.

The focus groups provided invaluable insight and information, and helped identify and clarify issues for consideration in the design and operation of the information system and outreach efforts. Information received from the focus groups was incorporated throughout the course of the research project.

This information formed the basis of a work session with health educators and an oncology expert, where the topics were reduced to a final 15.

The results of the two to three month period of development and deliberations yielded a total of 25 messages within five categories as noted in **Table 19.**

Table 19: Message Category and Titles - Automated Telephone System

MESSAGE CATEGORY	MESSAGE TITLES
1. Breast Cancer: What You Need to Know	1. What is breast cancer? 2. Put fear aside - breast cancer is curable. 3. Breast cancer myths. 4. Every breast lump or pain is not cancer. 5. Breast cancer and African American women 6. Men, you can get breast cancer too
2. Breast Cancer Risk Factors	7. Are you at risk for getting breast cancer? 8. Do genetics and family history play a role? 9. Breast cancer, the pill and menopause 10 Your lifestyle and how it affects breast cancer 11. How to lower your risk for getting breast cancer 12. Role of Diet 13. Role of Exercise
3. Breast Health	14. Breast examination (Related information by fax or mail also available) 15. All about mammograms (Related information by fax or mail also available) 16. When should you get a mammogram? 17. Mammogram services 18. Where do I get more information about breast cancer?
4. Treatment Options	19. How can breast cancer be treated? 20. Breast cancer and surgery 21. Chemotherapy, radiation treatment and Hormones 22. Medical frontiers-new research
5. Recovery and Follow-up	23. There is a life after breast cancer. 24. Community bulletin board (Related information by fax or mail available) 25. How should I support a friend or relative with breast cancer?

NOTE: Shaded messages represent sub-messages that are not listed in the directory, but are branched in the menu structure.

TASK 2: Research technical system design issues

a) Establish minimum technical parameters
b) Investigate add-on technology options
c) Determine available system options
d) Determine a technical configuration

Technical design included those activities associated with acquisition and installation of the hardware, software and telephone lines to support the telecommunication system. This effort also included "loading" the system with the message content.

The telecommunication system operated on a personal computer platform, using Verbatim telecommunications software. In selecting the software, research was conducted to ensure that the system that would provide the necessary data to enable TeleSonic to respond to the questions posed in the hypothesis.

The equipment, software, and telephone lines were configured to support the basic call pattern for the system. Call flows were developed to give callers options, yet to capture as much data as possible. **Appendix J** shows the flow of caller activity for the automated

system. **Appendix K** shows the flow of caller activity for those calling the live counselors at the Cancer Information Service and the American Cancer Society.

TASK 3: Research issues/topics and produce messages identified for the information system's audiotex/faxiotex library

a) Identify and secure any additional required resources
b) Conduct research
c) Write new scripts
d) Edit scripts
e) Use advisors/consultants to review scripts
f) Identify voice production talent
g) Produce scripts
h) Install/dub messages onto system

All activities related to Task 3 were successfully completed.

As described in Task 1, above, more than 70 topics were originally identified. Then after receiving input from advisors through rankings and discussions, the number of topics was reduced. This information formed the basis of a work session with health educators and an oncology expert, where the topics were reduced to a final 15. Scripts were then developed for these topics. A complete set of scripts is included in **Appendix L**.

Using research information and advice from advisors, scripts were written and edited by project staff. Each script was then grouped and read by at least three advisors. All scripts were reviewed by an oncology expert. The input from these two external sources resulted in a re-editing of scripts and a final work session with the oncology practitioner. The scripts were then professionally recorded for the telephone information system, and dubbed onto the system by project staff.

A disclaimer message was also included in the system, which stated "Messages and titles in this library are the property of TeleSonic. The information you've just heard is for educational purposes only. If you need medical advice, please contact a doctor or appropriate health care professional."

TASK 4: Acquire and set up the demonstration system model.

a) Obtain price data
b) Select best equipment options
c) Acquire the necessary equipment
d) Set up equipment for testing and loading

e) Install the technical configuration design
f) Beta test the application in-house
g) Make final modifications to the technical design
h) Install system
i) Provide training.

All activities related to Task 4 were successfully accomplished.

As described in Task 2, the telecommunication system operated on a personal computer platform, using Verbatim telecommunications software. In selecting the software, research was conducted to ensure that the system that would provide the necessary data to enable TeleSonic to respond to the questions posed in the hypothesis.

Once the equipment was acquired, set up, and tested, the application was loaded. Then all staff participated in an internal beta test of the system. After modifications were made, an additional external beta test was conducted encompassing all project advisors.

After the external beta test, final modifications were made to the system. Then, all staff were trained in system operation, maintenance, and data collection procedures.

TASK 5: Establish system and data retrieval routines.

a) Define evaluation criteria
b) Develop guidelines for maintenance and monitoring
c) Identify dynamic information sources
d) Designate personnel responsible for tracking data.

All activities related to Task 5 were successfully completed.

The technical system was designed to collect data related to six issues:

1. Number of callers from a particular area
2. Number of topics accessed by a caller, general preferences, preferences by census area, preferences for calls taking the personal assessment
3. Number of callers who transferred to a live counselor by census area
4. Analysis of caller assessments with caller topical preference, including live counselor transfers, by call census area
5. Number of callers requesting fax or hard copy by census area
6. Number of callers by census area who responded to follow-up surveys

In preparation for the activation of Test One, system routines, guidelines, and monitoring procedures were established. In addition, staff training was conducted covering procedures for handling operator calls and daily maintenance of the system. The system was monitored and data was collected on a regular basis.

Data on the call behavior by treatment group was collected automatically by a call log. It should be noted that the originating phone number of the call was not tracked, to protect the identity of callers. The only identifying information came from those callers who voluntarily offered to provide follow-on feedback. Computer program routines were written to purge data and generate reports on variables needed for research analysis. Data were purged to exclude staff calls for daily line qualification, review and system evaluation. These calls were coded for easy extraction. In addition, computerized calls into the system were purged based on computer programming patterns that were discerned. These included set patterns of seven calls to the same telephone number at six to seven second intervals. Call reports were also monitored to ensure that no calls were received from areas blocked from the call region.

Significant amounts of data were available to us through the software; however, report generation was labor intensive and time consuming. To improve our data reporting capabilities, we developed a database report generator package that allowed us to run ad hoc reports for any time period specified by the end user. Reports could be run for as little as a day, or as long as three months. These ad hoc reports were available simply by using "point and click" technology. The following reports were available in the report generator package:

- Message and Document Report (mail and fax)
- Call Volume Report
- Survey Report
- Profile Report

These reports are included in **Appendix D, Test One Data Reports** and **Appendix E, Test Three Data Reports.**

TASK 6: Develop and implement the outreach and promotional campaign plans for the two target groups within each region.

a) Define the target audience
b) Investigate impact of program name
c) Develop, produce, and disseminate promo materials
d) Enlist the assistance of professional and community networks
e) Conduct outreach and promo efforts.

To test its hypothesis, TeleSonic identified four main target groups by race and income level: a White Low-moderate income group (WLM), a White Middle-Upper income group (WMU), an African American Low-moderate income group (AALM), and an African American Middle-Upper group (AAMU). This structure allowed TeleSonic to measure response rates to a direct mail campaign by both race and income.

In developing the program name, assistance was enlisted from project advisors.

Two different focus groups were conducted during the first phase of the test in developing the promotional campaign. The first series of four focus groups were used to generate ideas, recommendations and reactions used in the development of the direct mail campaign. These groups were identified by organizations in the target census areas that have memberships representative of the test design. One focus group was identified for each of the four targeted population groups for the study. The only modification was that the focus groups for the White low to moderate income group became a mixed group of white and African American females.

Some of the key findings are noted in the following tables. In most cases, the information summarized in the tables is based on the most frequently referenced response.

1. Why did you offer to participate in a discussion on breast cancer?

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1. Personal concerns about breast cancer	x	x	x	na
2.Family history	x	x	x	na
3. Lifestyle concerns	x	x		na

The responses to this question were fairly consistent across each of the focus groups. Most frequently, the members stated a relative with breast cancer or their own concern about the disease as their primary reason for participation. Lifestyle comments included statements like busy schedules and personal health matters. This question was not asked of the White Upper to middle income group.

2. What is your attitude toward breast cancer?

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1. Fear or "I'm scared"	x	x	x	x
2. Don't want to know	x	x	x	
3. Resentment toward the medical establishment for not supporting standards they promulgate				x
4. Believe in preventive measures or want to know more	x	x		x

The range of responses to this question was broader. Most frequently referenced across all groups was the issue of fear, confusion or feeling of being scared. Also included were comments describing actions that clearly showed an interest in taking preventive actions like getting a mammogram, self-examinations, or wanting to know more about the topic.

3. Why do you suppose breast cancer deaths have risen 18% in the last 20 years in African American women of all ages?

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1. Lack of preventative measures	X	x	x	na
2. Other priorities		x	x	na
3. Requires extra cost, efforts or insurance	X	x	x	na
4. Fear		x	x	na

The responses summarized for this question consistently related to the issue of requiring additional cost, effort, or insurance. All three were mentioned by the low to moderate African American income group, with cost being the most frequently referenced problem for the low to moderate mixed race group. No response is provided from the upper to middle income white focus group. Their general

response to this question was that it is possible that the death rate is higher because there is a better reporting system. They also voiced concerns about chemicals in the environment and the local incidence pattern.

4. Death related to cancer can be greatly reduced through eating right, not smoking, and finding cancer early. What would be the best thing to say to women to get them to do these things?

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1.More advertisement	x			
2.Push benefits/hope with early treatment, promote good news	x	x	x	x
3.Use scare as a motivator			x	
4 Show empowerment through information		x		x

While a few women in the mixed low to moderate income group were motivated by scare tactics, all women wanted to hear positive, information about possibilities and success stories and empowerment. One group even proposed the idea about using well known stores like Nordstrom to provide services for persons who have had their breasts removed. Only one group, the low to moderate income African American group, indicated the importance of enhanced advertisement similar to the ads on smoking. Discussions from all groups inferred advertisement as being necessary.

5. Which is better to tell people about:

a. Facts about breast cancer deaths
b. Ways to help lessen the risk of breast cancer
c. Other?

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1. Facts about breast cancer deaths	na	x		na
2. Ways to help lessen the risk of breast cancer	na	x	x	na
3. Other?				na

Because this question was not asked in all focus groups, the responses are mixed. Those persons in the upper to middle income African American group that suggested "facts" also spoke to the importance of presenting the information in a positive format and not heighten fear.

6. Which topics about breast cancer would you listen to? Respondents were asked to pick only one from the following list.

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1.Breast cancer and African American women	2	0	3	0
2. Do genetics and family history play a role in breast cancer?	2	3	1	0
3. Breast cancer, the pill and menopause	2	0	0	2
4. How to lower your risk of breast cancer	4	3	5	0
5. What is breast cancer?	0	0	1	0
6. Are you at risk of getting breast cancer?	0	0	1	1
7. Your lifestyle and how it effects breast cancer?	0	0	0	2
8. How can breast cancer be treated?	0	0	0	3

7. Are there any topics you might want to learn about cancer that you feel would get your attention if you heard about it through the media?

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1. Prevention/detection/ treatment	x	x	x	
2. Research			x	x
3. Other	x	x	x	x

The range of responses to this question varied. The detail report shows the greatest concentration of responses related to the category of prevention, treatment or research or to the category defined as "other". Marked differences exist within each category. It should be noted that one respondent from the low to moderate income African American group pointed out that she would not listen at all to information about breast cancer.

8. Have you received any information about breast cancer in the last several years? If yes, where? (Presented in yes/no responses) and from which source would you rather learn about breast cancer? (Represented in a numerical response)

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/ mod	White up/mid
1. Advertising	no/1	no/2	no/0	no/2
2. News media	yes/0	no/4	no/0	no/2
3. Your doctor	no/6	yes/3	no/2	no/4
4. Health organization	yes/0	yes/3	no/0	yes/0
5. Other	no/0	yes/0	yes/1	yes/0

The responses from the focus group participants cover two questions. A yes/no response is provided to the question about whether information has been received in the last several years. A numerical response is provided indicating the number of participants having a preference for how they should receive information on breast cancer.

9. How would you design a mailer?

Response Type	African Amer. low/mod	African Amer. up/mid	Mixed low/mod	White up/mid
1. Appearance	bright colors, postcard	colorful, texture, oversized, personalized	persona-lized, message on envelope	Large print, post-card, easy reader
2. Focus of message content	"Don't just do it for you, do it for your children"	"Do you want to take a chance with your life?"	"It can happen to you--show positive"	
3. Miscellaneous considerations	incentive gift	coupon and notice of free gift	Reference sources of authority	Schedule of mammo-gram site

A second series of two focus groups that were identified to react to tentative mail designs and assist in offering information and input on the mail design that would bring the most effective response. These two groups included the members of the first low to moderate African American focus group, and a low to moderate white income group of women who were contacted for the first time to provide their reaction to the proposed mail designs.

Each group was given choices of four postcard designs to critique. Input from the two focus groups, health educator advisors, and project staff were reviewed, and resulted in the final postcard design (See **Appendices B and C**).

The folded postcard (**Appendix C**) was mailed to all participants receiving Treatment A-- the automated telecommunication system. Subjects in Treatment B-- the live counselor telecommunication system received the double-sided postcard (**Appendix B**).

TASK 7: Conduct at least two comparable tests of the system.

All Activities related to Task 7 were successfully completed. Over the three- year research period, one pre-test and four test efforts were conducted, as follows:

- A **Pre-Test**, conducted in Baltimore, Maryland, prior to initiating Test One. This pre-test examined the response patterns of callers, using a small sampling from the targeted households. The pretest was designed to provide information to help determine the number of mailings for Test One and subsequent tests. In addition, the pretest was designed to obtain any information regarding the subjects' reactions to the content and the overall system. This information was used to make adjustments to the system before Test One.
- **Test One**, conducted in Baltimore, Maryland. This statistically significant test was a comparative assessment of caller preferences in four target groups for an automated telephone information system versus a live counselor referral service.
- **Test Two**, conducted in Annapolis, Maryland. This anecdotal assessment compared respondent patterns to an automated telephone information system versus an on-line bulletin board system in an African American low-income target group.
- **Test Three**, conducted in Philadelphia, Pennsylvania. This statistically significant test was a comparative assessment of caller preferences in four target groups for an automated telephone information system versus a live counselor referral service. Test Three mirrored the design of Test One in a different geographic area, and was designed to validate the statistically significant results of Test One.
- **Test Four**, conducted in Baltimore, Maryland. This anecdotal test compared caller response patterns to different promotional media and different media messages in an African American low-income target group.

TASK 8: Research, define, and identify appropriate future modes of sustaining the information system beyond the test phase.

All activities related to Task 8 were successfully completed.

Research was conducted related to determining appropriate target markets for the Breast Health Information System, as well as the geographic targeting process. We determined that health-related organizations and institutions, insurance companies, and human resource departments could best benefit from a "health information line". The system design that was developed and tested during the research period for breast health information could easily be used as a "template" and applied to any area of health information and disease prevention.

To maximize the Breast Health Information System's commercial appeal, extensive research was conducted in designing the system's product features, menuing structure, and user interface. Between Tests Three and Four, the system was re-designed based on user, focus group, and evaluator feedback collected over the first three tests. The result was a more marketable, user friendly system. In addition, one of the main focus points of the system "re-design" was to create a "health information template" that would accommodate potential buyers from different market segments and of different sized organizations. The resulting product provides convenience and flexibility in its design, so as to accommodate a multitude of different potential buyers.

During the project period, extensive focus group sessions were conducted to both validate test results, and to obtain target group evaluations of the system and recommended improvements. These focus group comments and suggestions were used in re-designing the system's menu structure, and in defining our target market.

Over the three-year research period, many meetings were conducted with project advisors, private health industry professionals, and health-related organizations concerning the applicability of the health information line to their health outreach and disease prevention efforts. Health information officers at national health organizations, such as the Cancer Information Service, were contacted and meetings were held to discuss the possibilities of implementing such a system at their locations.

Officials at the Cancer Information Service were extremely impressed with the results achieved from our tests, and indicated a strong interest to work with TeleSonic on an ongoing basis. They also requested copies of our test results to share with management at the Cancer Information Service.

Test Two (comparison of the automated system to an on-line computer system) was designed and implemented with an eye towards sustaining the system. Discussions were held with both the physician's office used for testing, as well as management from the Annapolis Housing Authority, about the possibilities of implementing such a system in these low-income communities.

A marketing-oriented journal article targeted toward health information and outreach professionals was also written and submitted detailing the research process used, the system that was designed, and the results obtained.

Additional ideas generated for sustaining the system included developing a "fee for use" service where TeleSonic operated the system for a client in exchange for a fee (as opposed to selling an organization a system). Another idea included using paid sponsorship ads within the system to help organizations support the costs of operating the system.

As a follow-on effort to the study, TeleSonic will consider sharing approximately 10 to 15 copies of the report results in a specially prepared marketing package. The package will be distributed to health care organizations on both the provider side and the managed care side. The report results have implications for health care providers in other fields beside breast cancer. For example, providers of information to arthritis patients, diabetes patients, HIV-positive patients, and others may all find value from the results of TeleSonic's study, which shows many effective ways to share health information to informationally-hard-to-reach populations.

TASK 9: Document and report results.

a) Implement documentation procedures
b) Produce internal quarterly reports
c) Produce annual and final reports
d) Provide ongoing program administrative support.

All activities related to Task 9 were successfully completed. During the research period, documentation procedures were designed and implemented, an administrative manual was developed, internal reports were generated, two annual reports and a final report were developed, and ongoing program administrative support was provided.

VI. CONCLUSIONS

A. SUMMARY OF IMPLICATIONS OF THE COMLETED RESEARCH

Anticipated Results versus Results Achieved

TeleSonic's originally anticipated results of the research study and development project included:

1. **The successful design, development, and operation of a multimedia automated telephone information system which includes an on-line interactive caller quiz, an audio library of static and dynamic (changing) information messages, transfer ability to a live helpline assistant, caller message taking and feedback capability, and supplementary print material available immediately by fax, or within a few days by mail.**

This anticipated result was successfully achieved. A multimedia automated telephone information system was developed that included an on-line interactive caller quiz, an audio library of static and dynamic (changing) information messages, transfer ability to a live helpline assistant, caller message taking and feedback capability, and supplementary print material available immediately by fax, or within a few days by mail.

2. **An increase in the number of minority and underserved females seeking breast cancer information.**

In both Tests One and Three, statistically significant preferences were shown by low-moderate income level women for the automated telephone system. This statistical preference indicates that the automated system is an effective way of increasing the number of minority and underserved women to obtain information about breast cancer.

3. **An increase in the number of females who take proactive steps to sign up for mammography screening and/or make an appointment with a physician.**

In Tests One and Three this information was difficult to track, and information obtained was based on self-reports only (through follow-up surveys). To enable us to get better information in this area, we re-designed the automated system for Test Four to allow us to more directly track the number of women who signed up for a mammography screening or who made an appointment with a physician.

In Test Four the following results were obtained:

- Of the 94 library messages listened to, 11 related to mammograms.
- Of the 41 prevention step messages listened to, 22 related to mammograms, 7 were about breast self-examination, 5 were about doctor appointments, and 8 were about risk factors.
- Of the five transfers to Johns Hopkins Breast Clinic, all five were to make an appointment for a mammogram.
- Of the nine documents requested, six were for information about mammograms and three were for information about breast self-examination.
- Of the 31 survey participants, 9 indicated they would do a monthly breast self-examination, 14 stated they would get a mammogram, and 5 said they would make an appointment with a doctor.

These results show a clear preference by women for information about mammograms and low-cost appointment options. Women were much more eager and willing to get a mammogram than to make a doctor's appointment.

4. **The collection of previously unavailable pertinent data measuring the efficacy of live telephone health information services versus automated telephone health information systems.**

In both Test One and Test Three, low-moderate income level callers showed an overall preference for the automated telephone information system over a live counselor referral system. As detailed earlier in this report, multiple focus group sessions conducted during the research period validated these findings.

5. **The enhancement of the breast cancer information and communication infrastructure for use by physicians, patients, and concerned family members and friends.**

The system designed during the research period and the information developed represent a unique and new way for physicians, patients, family members, and friends to get easy information about breast cancer and breast cancer prevention.

Comparison of Hypotheses to Results Obtained

This section compares our hypothesis and related hypotheses to the results obtained during the research period.

Major Hypothesis: Multimedia automated telephone systems enhance live referral alone as a vehicle to reach the informationally hard-to-reach.

VI. CONCLUSIONS

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Anticipated Results versus Results Achieved

TeleSonic's originally anticipated results of the research study and development project included:

1. **The successful design, development, and operation of a multimedia automated telephone information system which includes an on-line interactive caller quiz, an audio library of static and dynamic (changing) information messages, transfer ability to a live helpline assistant, caller message taking and feedback capability, and supplementary print material available immediately by fax, or within a few days by mail.**

This anticipated result was successfully achieved. A multimedia automated telephone information system was developed that included an on-line interactive caller quiz, an audio library of static and dynamic (changing) information messages, transfer ability to a live helpline assistant, caller message taking and feedback capability, and supplementary print material available immediately by fax, or within a few days by mail.

2. **An increase in the number of minority and underserved females seeking breast cancer information.**

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In Tests One and Three this information was difficult to track, and information obtained was based on self-reports only (through follow-up surveys). To enable us to get better information in this area, we re-designed the automated system for Test Four to allow us to more directly track the number of women who signed up for a mammography screening or who made an appointment with a physician.

Over the three-year research period, TeleSonic found that when faced with the choice of getting preventive health care information from an automated telephone information system versus a live counselor, both African American and White lower income women consistently choose the automated telephone information system. In contrast, middle-to-upper income White women choose to speak to a live counselor. *These results support the project's major hypothesis*: that using a multimedia automated telephone information system is an effective means of reaching "informationally hard-to-reach" populations, and getting them to take proactive, preventive care steps against breast cancer. Based on these results, we can conclude that TeleSonic's method has considerable implications for many areas of health care marketing, prevention, and treatment, particularly in targeting and reaching traditionally "hard-to-reach" populations.

Related Hypotheses:

1. **Callers overall will show a greater tendency to call a multimedia automated telephone system combined with live referral than to call the live referral alone.**

In both Test One and Test Three, low-moderate income level callers showed an overall preference for the automated telephone information system (combined with a live counselor transfer option) over a live counselor referral system.

As detailed earlier in this report, multiple focus group sessions conducted during the research period validated these findings.

2. **Within racial groups, callers at different socio-economic status (SES) levels will show significant differences in caller preferences for use of a multimedia automated telephone system with a live referral option compared to live referral alone.**

As stated above, over the three-year research period TeleSonic found that when faced with the choice of getting preventive health care information from an automated telephone information system versus a live counselor, both African American and White lower income women consistently choose the automated telephone information system. In contrast, middle-to-upper income White women choose to speak to a live counselor.

Also, as detailed earlier in this report, multiple focus groups conducted by racial and income groups confirmed these findings.

3. **Callers at lower SES levels will show a significant preference for the use of a multimedia automated telephone system with a live referral option compared to live referral alone.**

As stated above, over the three-year research period TeleSonic found that when faced with the choice of getting preventive health care information from an automated telephone information system versus a live counselor, both African American and White lower income women consistently choose the automated telephone information system. In contrast, middle-to-upper income White women choose to speak to a live counselor.

Also, as detailed earlier in this report, multiple focus groups conducted by racial and income groups confirmed these findings.

4. **Callers with higher SES levels will show significant differences by racial groups in their preference for the use of a multimedia automated telephone system with a live referral option compared to live referral alone.**

As stated above, over the three-year research period TeleSonic found that when faced with the choice of getting preventive health care information from an automated telephone information system versus a live counselor, both African American and White lower income women consistently choose the automated telephone information system. In contrast, middle-to-upper income White women choose to speak to a live counselor.

Also, as detailed earlier in this report, multiple focus groups conducted by racial and income groups confirmed these findings.

5. **Callers with lower SES across racial groups will show a preference for the use of a multimedia automated telephone system with a live referral option compared to live referral alone.**

In both Test One and Test Three, callers showed an overall preference for the automated telephone information system (combined with a live counselor transfer option) over a live counselor referral system.

As detailed earlier in this report, multiple focus group sessions conducted during the research period validated these findings.

6. **A culturally sensitive outreach strategy will increase caller volume compared to a less culturally focused outreach strategy.**

In Test Four, TeleSonic compared caller responses to a generic versus a culturally sensitive outreach strategy across three different types of media: direct mail, supermarket flyers, and radio public service announcements. Results from this test varied by promotional method, and were thereby inconclusive. In the case of direct mail, callers preferred the "treated" (culturally sensitive) piece. In the supermarket test, more callers preferred the "untreated" piece; however, as stated earlier in this report, TeleSonic believes that this may be related

to the uneven distribution of the treated versus untreated pieces at the supermarkets. In the radio test, callers preferred the untreated message.

7. **Callers in different geographical areas will show a significant preference for a multimedia automated telephone system with live referral compared to live referral alone.**

Test One and Test Three were designed to test the same test design in two different geographical areas in an effort to "validate" results. In both tests/geographical areas, callers showed an overall preference for the automated system.

Implications of the Completed Research

Results of TeleSonic's study have considerable implications for many areas of health care marketing, prevention, and treatment, particularly in targeting and reaching large groups of traditionally "hard-to-reach" populations.

Because TeleSonic's three-year test has shown that the method is highly effective for reaching specific populations and then encouraging them to take preventive care actions, any company or organization that is interested in pinpointing specific populations, as well as any group involved in prevention and outreach can gain substantial target marketing benefits from this method.

Insurance companies and health care organizations looking for ways to control costs can use this method to target high-risk individuals and provide them with preventive care information. State and County Health Departments can identify high incidence areas of any disease to cost-effectively target outreach efforts. Hospitals, research centers, and national health organizations and associations can target specific populations to refine their health promotion and outreach efforts. In addition, all these groups can expand and enhance targeted outreach efforts by offering a 24-hour telephone information service where callers can get sensitive health care information in a private, non-threatening, and convenient way.

The result is an innovative technique that sets new standards in target marketing and opens new doors in the areas of disease prevention and outreach.

B. RECOMMENDED CHANGES AND FUTURE WORK

Based on research conducted under Task 8 of this project, we determined that health-related organizations and institutions, insurance companies, and human resource departments could best benefit from a "health information line". The system design that

was developed and tested during the research period for breast health information could easily be used as a "template" and applied to any area of health information and disease prevention.

To maximize the Breast Health Information System's commercial appeal, extensive research was conducted in designing the system's product features, menuing structure, and user interface. In addition, many focus group sessions were conducted to get the user's perspective. The resulting product provides convenience and flexibility in its design, so as to accommodate a multitude of different potential buyers.

TeleSonic's future work will center on marketing the breast health information system, as well as the "health information template" to the target market described above.

One area where we recommend that future work could be highly beneficial is in the area of further refined income level assessments. The current research assessed the behavior patterns of low-moderate ($0 to $24,999 annual household income) versus middle-upper ($25,000 and above annual household income) income level persons. Based on the results achieved and the statistically significant preference of low-moderate income groups for the automated system, we believe that a further refinement of income level assessment to coincide with census breakdowns would be highly beneficial. Great insight into the behavior patterns of lower income ($0 to $14,999 annual household income) versus low-moderate income persons ($15,000 to $24,999 annual household income) could be gained through this analysis. Based on focus group discussions and market research, TeleSonic suspects there may exist great differences in these behavior patterns, and thus better ways of reaching these persons.

Another area for potential further research includes developing and testing a more elaborate tracking structure for determining the subsequent actions taken by users of the automated system. This type of research would provide very powerful data on the effectiveness of automated telephone technology.

One other area for future research includes development and testing of a breast health information system that utilizes touchscreen technology. Through both the focus groups as well as Test two (the-on-line computer test), we learned that literacy is a big roadblock for many lower income persons in obtaining health-related information. A touchscreen system placed in public areas or health facilities could give persons with literacy difficulties access to the latest information about breast cancer.

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VIII. APPENDICES

Included under separate cover.